

ELASTOMERIC DIELECTRIC POLYMER FILM SONIC ACTUATORAbstract of the Disclosure

A sonic actuator including a multi-layer membrane having a non-metallic elastomeric dielectric polymer layer with a first surface and a second surface, a first compliant electrode layer contacting the first surface of the polymer layer, and a second compliant electrode layer contacting the second surface of the polymer layer. The actuator further includes a support structure in contact with the sonic actuator film. Preferably, the non-metallic dielectric polymer is selected from the group consisting essentially of silicone, fluorosilicone, fluoroelastomer, natural rubber, polybutadiene, nitrile rubber, isoprene, and ethylene propylene diene. Also preferably, the compliant electrode layer is made from the group consisting essentially of graphite, carbon, and conductive polymers. The support structure can take the form of grid having a number of circular apertures. When a voltage is applied to the electrodes, portions of the film held at the aperture of the support structure can bulge due to the electrostriction phenomenon. The resultant "bubbles" can be modulated to generate sonic vibrations, or can be used to create a variable surface for airflow control.